WHAT IS CLAIMED IS:

1. An optical write-in head for applying light carrying image information to a photosensitive substance, comprising:

an array light source having a plurality of dot light sources, each of which selectively emits the light corresponding to the image information; and

a lens array facing the array light source, wherein the lens array has a plurality of lens elements which corresponds to the plurality of dot light sources respectively,

wherein an angular aperture θ of each of the lens elements is set in a range of about 14° to 18°.

2. The optical write-in head according to claim 1, wherein a degree of overlapping of the lens elements is set in a range of about 1.10 to 2.00.

3. The optical write-in head according to claim 1, wherein the angular aperture θ of each of the lens elements is set such that the average of a resolution MTF of the entire lens array is about 50% or more.

4. The optical write-in head according to claim 1, wherein the angular aperture θ of each of the lens elements is set such that a period fluctuation of the resolution of the lens array is about 10% or less.

5. The optical write-in head according to claim 1, wherein the angular aperture θ of each of the lens elements is set such that a focus depth is obtained to control a

drop in resolution at approximately 5% caused by a defocus of about ±20 μm due to an attachment error and eccentricity of the photosensitive substance.

6. The optical write-in head according to claim 1, wherein the angular aperture θ of each of the lens elements is set such that a minimum required level of transmitted light amount can be obtained by an increase in a light amount from the array light source to accommodate a shortage in amount of light transmitted through the lens array.

7. The optical write-in head according to claim 1, wherein:

a conjugate length of the lens array is set about 20 mm or less, and

an operating length of the lens array is set about 2 mm or more.

8. The optical write-in head according to claim 1, wherein:

each of the lens elements is a gradient index rod lens; and

the lens array contains two rows of gradient index rod lens arrays.

9. The optical write-in head according to claim 1, wherein each of the dot light sources is a light emitting element.

10. The optical write-in head according to claim 1, wherein the array light source includes an optical shutter array and a light source of the shutter array.

11. An optical write-in head for applying light carrying image information to a photosensitive substance, comprising:

an array light source having a plurality of dot light sources, each of which selectively emits the light corresponding to the image information; and

a lens array facing the array light source, wherein the lens array has a plurality of lens elements which corresponds to the plurality of dot light sources respectively, wherein:

an angular aperture θ of each of the lens elements is set in a range of about 14 to 18°;

a degree of overlapping m of the lens elements is set in a range of about 1.10 to 2.00; and

an effective diameter d of each of the lens elements is set in a range given by an equation of $4\theta/\sqrt{(4\ m^2/\alpha^2 - 1)} \leq d \leq 20\theta/(n \cdot \cos^{-1}(-\alpha/2/m) + \sqrt{(4\ m^2/\alpha^2 - 1)})$, where an optical axial refractive index of each of the lens elements is n, an arranging period of the lens elements of the lens array is D, and a filling ratio of the lens array is α ($\equiv$ d/D).

12. An optical write-in head for applying light carrying image information to a photosensitive substance, comprising:

an array light source having a plurality of dot light sources, each of which selectively emits the light corresponding to the image information; and

a lens array facing the array light source, wherein the lens array has a plurality of lens elements which corresponds to the plurality of dot light sources

respectively, each of the plurality of lens elements receiving the light from a corresponding one of the dot light sources to focus the light on the photosensitive substance in order to forming a dot image, wherein:

an image forming range in which the lens array interconnects the dot images is divided at a predetermined width to define a plurality of image forming sections; and

the lens array has one of the following five characteristics:

[1] a characteristic that when the dot light sources are each lit, a difference between an average and the minimum of the contrast of the dot images in each of the image forming sections is about 18% or less;

[2] a characteristic that when the dot light sources are each lit, a difference between the maximum and the minimum of the contrasts of the dot images is about 30% or less in each of the image forming sections;

[3] a characteristic that when the dot light sources are each lit, the difference between the average of the contrasts of the dot image in each of the image forming sections and the average of the contrasts of the dot image in the adjoining image forming section is about 10% or less;

[4] a characteristic that when the dot light sources are each lit, a standard deviation of the contrasts of the dot images all over the image forming range is about 5% or less; and

[5] a characteristic that when the dot light sources are each lit, the standard deviation of the contrasts of the dot images all over the image forming range is about 12% or less of the average of the contrasts of the dot images all over the image forming range.

13. The optical write-in head according to claim 12, wherein:

the lens array is a rod lens array in which gradient index rod lenses are arranged in one or a plurality of rows; and

a fluctuation in diameter of the rod lenses is about an average rod lens diameter ± 0.5% or less.

14. The optical write-in head according to claim 12, wherein:

the lens array contains at least one row of a plurality of gradient index rod lenses; and

a fluctuation in light snaking period of the rod lenses is about an average light snaking period ± 0.25% or less.

15. The optical write-in head according to claim 12, wherein:

the lens array contains at least one row of a plurality of gradient index rod lenses; and

if an arranging pitch of the lens elements is represented by sign P, a conjugate length of the lens array is represented by sign TC, and a maximum of angles between optical axes of the adjoining rod lenses is defined by an array parallelism of the lens elements, the array parallelism of the lens elements is P/TC or less.

16. The optical write-in head according to claim 12, wherein:

when the lens array has the characteristic [1], the predetermined width is set about 10 mm;

when the lens array has the characteristic [2], the

predetermined width is set about 5 mm; and

when the lens array has the characteristic [3], the predetermined width is set about 1 mm.

17. The optical write-in head according to claim 12, wherein the dot light sources are arranged at a spacing of about 42 μm therebetween all over an effective width of the lens arrays.

18. The optical write-in head according to claim 12, wherein the contrast (MTF) of the dot images is defined by an equation of MTF(%) = (Imax - Imin)/(Imax + Imin) x 100, where a maximum and a minimum of the light amount of a predetermined one of the dot images in the image forming range are Imax and Imin.

19. An image forming apparatus comprising:

a drum having a surface on which a photosensitive substance is formed; and

an optical write-in head which applies light carrying image information to the photosensitive substance, the optical write-in head includes:

an array light source having a plurality of dot light sources each selectively emitting the light corresponding to the image information; and

an lens array facing the array light source, wherein the lens array has a plurality of lens elements which corresponds to the plurality of dot light sources respectively,

wherein an angular aperture θ of each of the lens elements is set in a range of about 14 to 18°.

20. An image forming apparatus comprising:

a drum having a surface on which a photosensitive substance is formed; and

an optical write-in head which applies light carrying image information to the photosensitive substance, the optical write-in head includes:

an array light source having a plurality of dot light sources each selectively emitting the light corresponding to the image information; and

an lens array facing the array light source, wherein the lens array has a plurality of lens elements which corresponds to the plurality of dot light sources respectively, wherein:

an angular aperture θ of each of the lens elements is set in a range of about 14 to 18°;

a degree of overlapping m of the lens elements is set in a range of about 1.10 to 2.00; and

an effective diameter d of each of the lens elements is set in a range given by an equation of $4\theta/\sqrt{(4\ m^2/\alpha^2 - 1)} \leq d \leq 20\theta/(n \cdot \cos^{-1}(-\alpha/2/m) + \sqrt{(4\ m^2/\alpha^2 - 1)})$, where an optical axial refractive index of each of the lens elements is n, an arranging period of the lens elements of the lens array is D, and a filling ratio of the lens array is α (= d/D).

21. An image forming apparatus comprising:

a drum having a surface on which a photosensitive substance is formed; and

an optical write-in head which applies light carrying image information to the photosensitive substance, the optical write-in head includes:

an array light source having a plurality of dot light

sources each selectively emitting the light corresponding to the image information,

a lens array facing the array light source, wherein the lens array has a plurality of lens elements which corresponds to the plurality of dot light sources respectively, each of the lens elements receiving the light from corresponding one of the dot light sources to focus the light on the photosensitive substance in order to forming a dot image, wherein:

an image forming range in which the lens array interconnects the dot images is divided at a predetermined width to define a plurality of image forming sections; and

the lens array has one of the following five characteristics:

[1] a characteristic that when the dot light sources are each lit, a difference between an average and the minimum of the contrast of the dot images in each of the image forming sections is about 18% or less;

[2] a characteristic that when the dot light sources are each lit, a difference between the maximum and the minimum of the contrasts of the dot images is about 30% or less in each of the image forming sections;

[3] a characteristic that when the dot light sources are each lit, the difference between the average of the contrasts of the dot image in each of the image forming sections and the average of the contrasts of the dot image in the adjoining image forming section is about 10% or less;

[4] a characteristic that when the dot light sources are each lit, a standard deviation of the contrasts of the dot images all over the image forming range is about 5% or less; and

[5] a characteristic that when the dot light sources are each lit, the standard deviation of the contrasts of the dot images all over the image forming range is about 12% or less of the average of the contrasts of the dot images all over the image forming range.

22. The image forming apparatus according to claim 21, wherein;

the lens array is one of a plurality of lens arrays;

the plurality of lens arrays superpose a plurality of colors of images to form one image; and

a fluctuation in angle of optical axes of the lens arrays with respect to a lens array attaching reference is not more than about ±0.02/TC (radian, TC; conjugate length of the lens array).

23. The image forming apparatus according to claim 21, wherein the dot light sources are arranged at a spacing of about 42 μm therebetween all over an effective width of the lens arrays.

24. The image forming apparatus according to claim 21, wherein the contrast (MTF) of the dot images is defined by an equation of MTF(%) = (Imax - Imin)/(Imax + Imin) x 100, where a maximum and a minimum of the light amount of a predetermined one of the dot images in the image forming range are Imax and Imin.

25. A method for inspecting an image forming apparatus, the image forming apparatus including an optical write-in head which applies light carrying image information to a photosensitive substance, the optical write-in head including an array light source having a

plurality of dot light sources each selectively emitting the light corresponding to the image information and a lens array facing the array light source, wherein the lens array has a plurality of lens elements which corresponds to the plurality of dot light sources respectively, the method comprising the steps of:

arranging the array light source and a light receiving element which receives the light from the plurality of dot light sources at a conjugate position with respect to the lens array;

lighting up the array light source through a uniform light emitting pattern all over an effective width of the lens array;

moving the array light source and the lens array toward the light receiving element in a direction in which lenses of the lens array are arranged to thereby cause the light receiving element to detect a light amount of each of the dot images interconnected by the lens array;

obtaining the contrast of all the dot images in an image forming range in which lens array interconnects the dot images;

dividing the image forming range at a predetermined width to form a plurality of image forming sections;

calculating the average of the contrasts of the dot images in each of the sections in accordance with a detection result by the light receiving element; and

deciding whether a difference between the average and the minimum of the contrasts of the dot images in each of the sections is not more than a predetermined value.

26. The method according to claim 25, wherein the light emitting pattern is created by lighting up the plurality of dot light sources roughly evenly spaced all

over the effective width of the lens array.

27. The method according to claim 25, wherein:

the dot light sources are arranged at a spacing of about 42 μm therebetween all over an effective width of the lens arrays; and

the predetermined value is set about 18%.

28. The method according to claim 25, wherein the contrast (MTF) of the dot images is defined by an equation of MTF(%) = (Imax - Imin)/(Imax + Imin) x 100, where a maximum and a minimum of the light amount of a predetermined one of the dot images in the image forming range are Imax and Imin.

29. A method for inspecting an image forming apparatus, the image forming apparatus including an optical write-in head which applies light carrying image information to the photosensitive substance, the optical write-in head including an array light source having a plurality of dot light sources each selectively emitting the light corresponding to the image information and a lens array facing the array light source, wherein the lens array has a plurality of lens elements which corresponds to the plurality of dot light sources respectively, the method comprising the steps of:

arranging the array light source and a light receiving element which receives the light from the plurality of dot light sources at a conjugate position with respect to the lens array;

lighting up the array light source through a uniform light emitting pattern all over an effective width of the lens array;

moving the array light source and the lens array toward the light receiving element in a direction in which lenses of the lens array are arranged to thereby cause the light receiving element to detect a light amount of each of the dot images interconnected by the lens array;

obtaining the contrast of all the dot images in the image forming range in which lens array interconnects the dot images;

dividing the image forming range at a predetermined width to form a plurality of image forming sections; and

deciding whether a difference between the maximum and the minimum of the contrasts of the dot images in each of the sections is not more than a predetermined value.

30. The method according to claim 29, wherein the light emitting pattern is created by lighting up the plurality of dot light sources roughly evenly spaced all over the effective width of the lens array.

31. The method according to claim 29, wherein:

the dot light sources are arranged at a spacing of about 42 μm therebetween all over an effective width of the lens arrays; and

the predetermined value is set about 30%.

32. The method according to claim 29, wherein the contrast (MTF) of the dot images is defined by an equation of MTF(%) = (Imax - Imin)/(Imax + Imin) x 100, where a maximum and a minimum of the light amount of a predetermined one of the dot images in the image forming range are Imax and Imin.

33. A method for inspecting an image forming

apparatus, the image forming apparatus including an optical write-in head which applies light carrying image information to a photosensitive substance, the optical write-in head including an array light source having a plurality of dot light sources each selectively emitting the light corresponding to the image information and a lens array facing the array light source, wherein the lens array has a plurality of lens elements which corresponds to the plurality of dot light sources respectively, the method comprising the steps of:

arranging the array light source and a light receiving element which receives the light from the plurality of dot light sources at a conjugate position with respect to the lens array;

lighting up the array light source through a uniform light emitting pattern all over an effective width of the lens array;

moving the array light source and the lens array toward the light receiving element in a direction in which lenses of the lens array are arranged to thereby cause the light receiving element to detect a light amount of each of the dot images interconnected by the lens array;

obtaining the contrast of all the dot images in the image forming range in which lens array interconnects the dot images;

dividing the image forming range at a predetermined width to form a plurality of image forming sections;

calculating the average of the contrasts of the dot images in each of the sections in accordance with a detection result by the light receiving element; and

deciding whether a difference between the average of the contrasts of the dot images in each of the sections and the average in the adjoining section is not more than a

predetermined value.

34. The method according to claim 33, wherein the light emitting pattern is created by lighting up the plurality of dot light sources roughly evenly spaced all over the effective width of the lens array.

35. The method according to claim 33, wherein:

the dot light sources are arranged at a spacing of about 42 μm therebetween all over an effective width of the lens arrays; and

the predetermined value is set about 10%.

36. The method according to claim 33, wherein if a maximum and a minimum of the light amount of a predetermined one of the dot images in the image forming range are represented by signs Imax and Imin, the contrast (MTF) of the dot images is defined by an equation of MTF(%) = (Imax - Imin)/(Imax + Imin) x 100.